THE CLAIMS

What is claimed is:

1. A micro-fabricated chip, comprising:

a stationary structure; and

a movable structure having a gimbal structure, the gimbal structure allowing pitch and roll motion of the movable structure with respect to the stationary structure.

2. The micro-fabricated chip according to claim 1, wherein the gimbal structure includes a dimple surface making a rolling-type contact with the stationary structure.

3. The micro-fabricated chip according to claim 2, wherein the gimbal structure includes a center bar and a plurality of bar members, each bar member having a first end that is attached to the center bar member and a second end that is attached to the stationary structure.

4. The micro-fabricated chip according to claim 1, wherein the gimbal structure includes a plurality of torsion bar members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

5. The micro-fabricated chip according to claim 1, wherein the gimbal structure includes a plurality of flexible members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

6. The micro-fabricated chip according to claim 1, further comprising a limiter structure having an in-plane structure and an out-of-plane structure, the limiter structure limiting movement of the movable structure away from the stationary structure by a predetermined distance.

7. The micro-fabricated chip according to claim 1, wherein the micro-fabricated chip is a passive chip structure.

8. The micro-fabricated chip according to claim 1, wherein the micro-fabricated chip is a microactuator.

9. The micro-fabricated chip according to claim 8, wherein the movable structure moves in a rotational direction with respect to the stationary structure.

10. The micro-fabricated chip according to claim 8, wherein the movable structure moves in a translational direction with respect to the stationary structure.

11. A suspension for a disk drive, comprising:

a load beam;

a micro-fabricated chip having a stationary structure and a movable structure having a gimbal structure, the stationary structure being attached to the load beam and the gimbal structure allowing pitch and roll motion of the movable structure with respect to the stationary structure; and

a slider attached to the movable structure.

12. The suspension according to claim 11, wherein the gimbal structure includes a dimple surface making a rolling-type contact with the stationary structure.

13. The suspension according to claim 12, wherein the gimbal structure includes a center bar and a plurality of bar members, each bar member having a first end that is attached to the center bar member and a second end that is attached to the stationary structure.

14. The suspension according to claim 11, wherein the gimbal structure includes a plurality of torsion bar members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

15. The suspension according to claim 11, wherein the gimbal structure includes a plurality of flexible members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

16. The suspension according to claim 11, wherein the micro-fabricated chip further includes a limiter structure having an in-plane structure and an out-of-plane structure, the limiter structure limiting movement of the movable structure away from the stationary structure by a predetermined distance.

17. The suspension according to claim 11, wherein the micro-fabricated chip is a passive chip structure.

18. The suspension according to claim 11, wherein the micro-fabricated chip is a microactuator.

19. The suspension according to claim 18, wherein the movable structure and the slider move in a rotational direction with respect to the stationary structure.

20. The suspension according to claim 18, wherein the movable structure moves in a translational direction with respect to the stationary structure.

21. The suspension according to claim 11, further comprising a flexible cable that is directly attached to the load beam without mechanical compliance and forms at least one electrical connection to the micro-fabricated chip.

22. A disk drive, comprising:

a suspension having a load beam;

a micro-fabricated chip having a stationary structure and a movable structure having a gimbal structure, the stationary structure being attached to the load beam and the gimbal structure allowing pitch and roll motion of the movable structure with respect to the stationary structure; and

a slider attached to the movable structure.

23. The disk drive according to claim 22, wherein the gimbal structure includes a dimple surface making a rolling-type contact with the stationary structure.

24. The disk drive according to claim 23, wherein the gimbal structure includes a center bar and a plurality of bar members, each bar member having a first end that is attached to the center bar member and a second end that is attached to the stationary structure.

25. The disk drive according to claim 22, wherein the gimbal structure includes a plurality of torsion bar members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

26. The suspension according to claim 22, wherein the gimbal structure includes a plurality of flexible members allowing the pitch and roll motion of the movable structure with respect to the stationary structure.

27. The disk drive according to claim 22, wherein the micro-fabricated chip further includes a limiter structure having an in-plane structure and an out-of-plane structure, the limiter structure limiting movement of the movable structure away from the stationary structure by a predetermined distance.

28. The disk drive according to claim 22, wherein the micro-fabricated chip is a passive chip structure.

29. The disk drive according to claim 22, wherein the micro-fabricated chip is a microactuator.

30. The disk drive according to claim 29, wherein the movable structure and the slider move in a rotational direction with respect to the stationary structure.

31. The disk drive according to claim 29, wherein the movable structure moves in a translational direction with respect to the stationary structure.

32. The disk drive according to claim 22, further comprising a flexible cable that is directly attached to the load beam without mechanical compliance and forms at least one electrical connection to the micro-fabricated chip.